

Joint Management Plan Revision (JMPR)

Monterey Bay National Marine Sanctuary (MBNMS)
Gulf of the Farallones National Marine Sanctuary (GFNMS)
Cordell Bank National Marine Sanctuary (CBNMS)

A Socioeconomic Overview of the Northern and Central Coastal California Counties as They Relate to Marine Related Industries and Activities

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INTRODUCTION

Purpose

The purpose of this document is to present the necessary background information on the local social and economic (socio-economic) environment for which changes in management actions in the JMPR study area can be analyzed in a socioeconomic impact analysis. The information presented here is what we have found to date to be the “best available information”. In addition to the socioeconomic characterization, we will provide some discussion on gaps in the data.

We will examine all direct uses potentially impacted; examples are 1) tourist/recreational use (e.g., whale watching, kayaking, scuba diving) and 2) commercial industries (e.g., commercial fishing, kelp harvesting). With respect to the local economies, these uses will have ripple or multiplier effects as measured by market economic values (e.g., output/sales, income, employment and tax revenues). In this report, we review available information to assess how important these industries are to the local economies. We will also present what is known about social and economic parameters that can be used in socioeconomic impact analyses.

Background

The MBNMS, GFNMS, and CBNMS are currently involved in a joint management plan revision (JMPR), a process that is required by law to take place approximately every five years. The management plans for the three northern and central California sanctuaries are between 9 and 20 years old. The National Marine Sanctuary Program (NMSP) is reviewing all three management plans jointly. These sanctuaries are located adjacent to one another, managed by the same program, and share many of the same resources and issues. In addition, all three sites share many overlapping interest and user groups. It is also more cost-effective for the program to review the three sites jointly rather than conducting three independent reviews. During the review, the sanctuaries will evaluate management and operational strategies, regulations, and boundaries. The review will look at whether the management programs at all three sanctuaries can be better coordinated.

A sanctuary management plan is a site-specific planning and management document that describes the objectives, policies, and activities for a sanctuary. Management plans generally outline regulatory goals, describe boundaries, identify staffing and budget needs, set priorities and performance measures for resource protection, research, and education programs. They also guide the development of future management activities.

Any data gap identified as necessary to support the socioeconomic impact analysis will be collected and compiled in a manner so as to capture both the temporal and spatial variation in activities. The information will be linked with economic parameters from existing studies to develop estimates of economic impacts as measured by changes in both market economic values (e.g., sales/output, income and employment) and non-market economic values (e.g., consumer's surplus and economic rents). Socioeconomic profiles of those potentially impacted will be compared against all users from a given user group and against the general population of the local area (e.g., the coastal California counties).

To accomplish the above requires a review of the existing literature and databases available and compiling this information in a manner that it can be used in the socioeconomic impact analyses. In some cases, available information will not support certain aspects of the proposed analyses. In

addition, supplemental data collection and analysis may not be feasible with time and resources available. What we are left with is what is commonly referred to as the “best available information”.

Future Projects

There are currently 3 projects planned in support of the JMPR.

In early 2003, the National Marine Sanctuary Program and California Sea Grant will hold a workshop to identify needed socio-economic studies associated with marine activities in the Joint Management Plan Revision study area.

In October 2002, Dr. Caroline Pomeroy and Dr. Michael Dalton were awarded, through California SeaGrant, \$70k to conduct a study titled “Market Channels and Value Added to Fish Landed at Monterey Bay Area Ports”.

In 2003, another study will be initiated that will investigate private household boat users. One of the major gaps in information for all California Sanctuaries is the number of private household boat users and amount of use, especially for non-consumptive users.

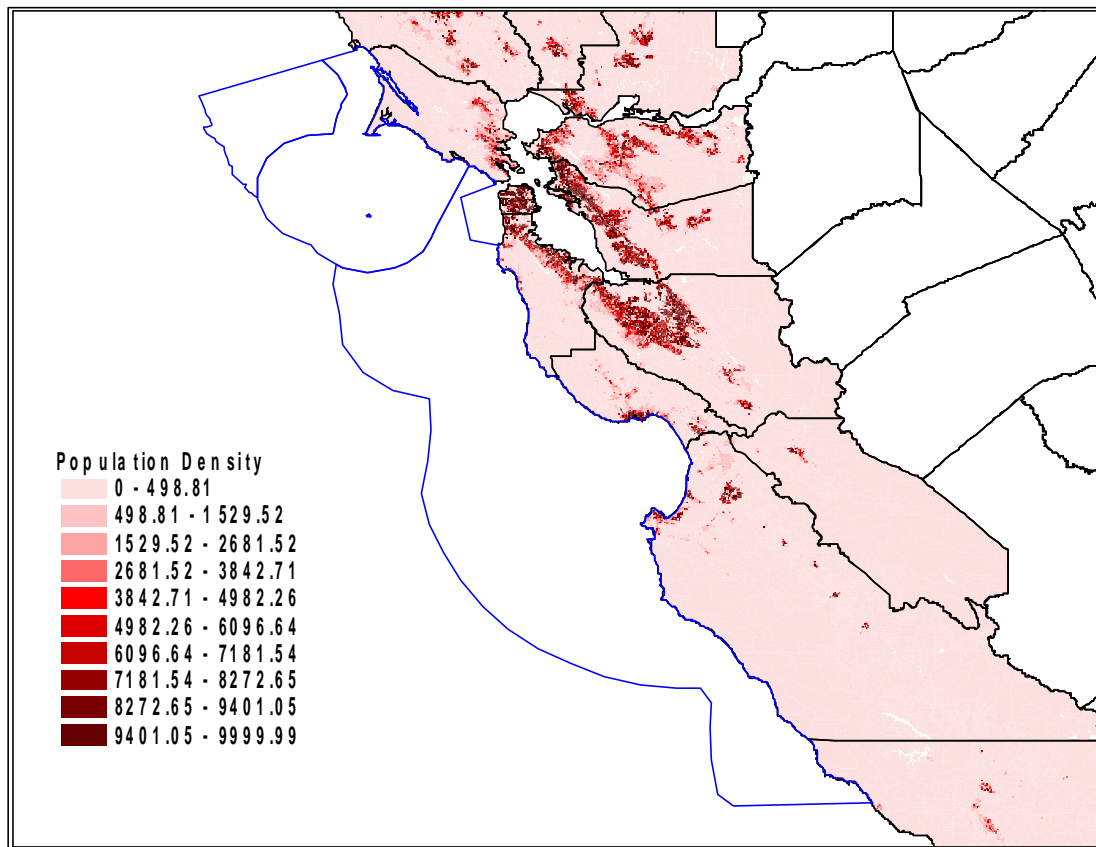
DEMOGRAPHIC AND ECONOMIC PROFILE

Population.

Population density and historical population estimates presented here are from the U.S. Department of Commerce, Census Bureau (<http://www.census.gov>), while population projections are from the University of California.

Population Density. The map below presents population density per square mile. Population is most dense in the area reaching from San Francisco, down the eastern portion of San Mateo County to the San Jose metropolitan area and continuing north through the western portion of Alameda County to the Oakland metropolitan area. Pockets of dense coastal population also exist in the Santa Cruz and Monterey Peninsula areas. Within the JMPR study area there are several inland areas of dense population, such as Salinas, Vallejo, Concord, Walnut Creek, Napa, Santa Rosa, and Fairfield.

Figure 1. Population Density Per Square Mile



Historical and Projected Population. The two largest counties in the study, in terms of population, are Santa Clara (1.7 million) and Alameda (1.4 million). Combined, these two counties account for almost 40 percent of the JMPR study area population. Santa Clara and Alameda Counties saw growth very much in line with the overall JMPR study area rate of 12.5 percent over the period 1990 to 2000. The smallest county in terms of population, San Benito (53 thousand), has shown the highest rate of growth, 45 percent, over the period 1990 to 2000 and 113 percent over the period 1980 to 2000. All counties are expected to continue their growth, with the exception of San Francisco, which is forecast to decline in population over the next few decades. See Table 1a and 1b.

Table 1a. Population, Historical and Projected, for Coastal California

	U.S. Census Bureau Actual					University of California Forecast				
	1960	1970	1980	1990	2000	2000	2010	2020	2030	2040
CALIFORNIA	15,717,204	19,953,134	23,667,902	29,760,021	33,871,648	34,653,395	39,957,616	45,448,627	51,868,655	58,731,006
JMPR STUDY AREA	4,237,970	5,441,401	6,204,241	7,312,783	8,226,651	8,410,361	9,480,827	10,382,363	11,409,517	12,437,966
MENDOCINO	51,059	51,101	66,738	80,345	86,265	90,442	105,225	118,804	133,440	149,731
SONOMA	147,375	204,885	299,681	388,222	458,614	459,258	544,513	614,173	684,311	753,729
MARIN	146,820	206,038	222,568	230,096	247,289	248,397	258,569	268,630	282,864	297,307
NAPA	65,890	79,140	99,199	110,765	124,279	127,084	143,542	157,878	174,240	191,971
SOLANO	134,597	169,941	235,203	340,421	394,542	399,841	479,136	552,105	625,619	698,430
CONTRA COSTA	409,030	558,389	656,380	803,732	948,816	931,946	1,025,857	1,104,725	1,189,501	1,264,400
ALAMEDA	908,209	1,073,184	1,105,379	1,279,182	1,443,741	1,470,155	1,654,485	1,793,139	1,938,547	2,069,530
SAN FRANCISCO	740,316	715,674	678,974	723,959	776,733	792,049	782,469	750,904	724,863	681,924
SAN MATEO	444,387	556,234	587,329	649,623	707,161	747,061	815,532	855,506	907,423	953,089
SANTA CRUZ	84,219	123,790	188,141	229,734	255,602	260,248	309,206	367,196	430,078	497,319
SANTA CLARA	642,315	1,064,714	1,295,071	1,497,577	1,682,585	1,763,252	2,021,417	2,196,750	2,400,564	2,595,253
MONTEREY	198,351	250,071	290,444	355,660	401,762	401,886	479,638	575,102	700,064	855,213
SAN BENITO	15,396	18,226	25,005	36,697	53,234	51,853	68,040	82,276	97,941	114,922
SAN LUIS OBISPO	81,044	105,690	155,435	217,162	246,681	254,818	324,741	392,329	461,839	535,901
SANTA BARBARA	168,962	264,324	298,694	369,608	399,347	412,071	468,457	552,846	658,223	779,247

Table 1b. Population Growth (% Change), Historical and Projected, for Coastal California

	U.S. Census Bureau Actual				University of California Forecast			
	1960 - 1970	1970 - 1980	1980 - 1990	1990 - 2000	2000 - 2010	2010 - 2020	2020 - 2030	2030 - 2040
CALIFORNIA	27.0	18.6	25.7	13.8	15.3	13.7	14.1	13.2
JMPR STUDY AREA	28.4	14.0	17.9	12.5	12.7	9.5	9.9	9.0
MENDOCINO	0.1	30.6	20.4	7.4	16.3	12.9	12.3	12.2
SONOMA	39.0	46.3	29.5	18.1	18.6	12.8	11.4	10.1
MARIN	40.3	8.0	3.4	7.5	4.1	3.9	5.3	5.1
NAPA	20.1	25.3	11.7	12.2	13.0	10.0	10.4	10.2
SOLANO	26.3	38.4	44.7	15.9	19.8	15.2	13.3	11.6
CONTRA COSTA	36.5	17.5	22.4	18.1	10.1	7.7	7.7	6.3
ALAMEDA	18.2	3.0	15.7	12.9	12.5	8.4	8.1	6.8
SAN FRANCISCO	-3.3	-5.1	6.6	7.3	-1.2	-4.0	-3.5	-5.9
SAN MATEO	25.2	5.6	10.6	8.9	9.2	4.9	6.1	5.0
SANTA CRUZ	47.0	52.0	22.1	11.3	18.8	18.8	17.1	15.6
SANTA CLARA	65.8	21.6	15.6	12.4	14.6	8.7	9.3	8.1
MONTEREY	26.1	16.1	22.5	13.0	19.3	19.9	21.7	22.2
SAN BENITO	18.4	37.2	46.8	45.1	31.2	20.9	19.0	17.3
SAN LUIS OBISPO	30.4	47.1	39.7	13.6	27.4	20.8	17.7	16.0
SANTA BARBARA	56.4	13.0	23.7	8.0	13.7	18.0	19.1	18.4

Sources: Population; U.S. Department of Commerce, Census Bureau (<http://www.census.gov>). Population Projections; University of California

Race. The demographic composition of the study area varies greatly. The four counties (Mendocino, Sonoma, Marin, and Napa) that make up the northern section of the study are predominately White (all at or above 80 percent) with less than average proportion of Blacks, Asians, Hispanics and Latinos. It is important to point out that Mendocino County's population is almost 5 percent American Indian. The Bay Area counties of Solano, Contra Costa, Alameda, San Francisco, San Mateo, and Santa Clara are the most diverse counties in the study area. The White population of this area drops to 50 to 65 percent and the Black and Asian populations increase dramatically to 10 to 30 percent. About one third of San Francisco's population is Asian. The remaining counties that comprise the Southern section of the study area are heavily populated with Hispanics and Latinos, particularly in Monterey and San Benito Counties where the Hispanic and Latino population stands at almost 50 percent.

Age and Gender. In terms of age, similar geographic variations do emerge. The Northern four counties identified above are also the oldest, in terms of median age (34 to 41 years). The proportion of people 45 and older is also greatest in these counties. With a few exceptions, the remaining counties in the study area are quite similar in terms of age. San Francisco has the highest proportion, 41 percent, of people 25 to 44 years and the lowest proportion, 15 percent, of people under 18 years. The counties with the highest proportions at retirement age, 65 years and older, are Napa and San Luis Obispo.

There are also variations in gender among the county populations. Three of the counties, Monterey, San Luis Obispo, and San Francisco, have higher populations of males. Sonoma, Contra Costa, Alameda, and San Mateo are more populated by females.

Table 2a. Demographic Profiles Coastal California Counties – Race, 2000

	Total Pop.	One race							Two or more races	Hispanic or Latino (of any race)
		One Race	White	Black or African American	American Indian and Alaska Native	Asian	Native Hawaiian and Other Pacific Islander	Some other race		
California	33,871,648	95.3	59.5	6.7	1.0	10.9	0.3	16.8	4.7	32.4
IMPR Study Area	8,226,651	95.2	60.3	6.6	0.8	16.4	0.5	10.6	4.8	21.7
Mendocino County	86,265	96.1	80.8	0.6	4.8	1.2	0.1	8.6	3.9	16.5
Sonoma County	458,614	95.9	81.6	1.4	1.2	3.1	0.2	8.4	4.1	17.3
Marin County	247,289	96.5	84.0	2.9	0.4	4.5	0.2	4.5	3.5	11.1
Napa County	124,279	96.3	80.0	1.3	0.8	3.0	0.2	10.9	3.7	23.7
Solano County	394,542	93.6	56.4	14.9	0.8	12.7	0.8	8.0	6.4	17.6
Contra Costa County	948,816	94.9	65.5	9.4	0.6	11.0	0.4	8.1	5.1	17.7
Alameda County	1,443,741	94.4	48.8	14.9	0.6	20.4	0.6	8.9	5.6	19.0
San Francisco County	776,733	95.7	49.7	7.8	0.4	30.8	0.5	6.5	4.3	14.1
San Mateo County	707,161	95.0	59.5	3.5	0.4	20.0	1.3	10.2	5.0	21.9
Santa Cruz County	255,602	95.6	75.1	1.0	1.0	3.4	0.1	15.0	4.4	26.8
Santa Clara County	1,682,585	95.3	53.8	2.8	0.7	25.6	0.3	12.1	4.7	24.0
Monterey County	401,762	95.0	55.9	3.7	1.0	6.0	0.4	27.8	5.0	46.8
San Benito County	53,234	94.9	65.2	1.1	1.2	2.4	0.2	24.9	5.1	47.9
San Luis Obispo County	246,681	96.6	84.6	2.0	0.9	2.7	0.1	6.2	3.4	16.3
Santa Barbara County	399,347	95.7	72.7	2.3	1.2	4.1	0.2	15.2	4.3	34.2

Sources: U.S. Department of Commerce, Census Bureau (<http://www.census.gov>).

Table 2b. Demographic Profiles Coastal California Counties – Age and Gender, 2000

Geographic area	Total Population	Percent of total population					Median age (years)	Males per 100 females	
		Under 18 years	18 to 24 years	25 to 44 years	45 to 64 years	65 years and over		All ages	18 years and over
California	33,871,648	27.3	9.9	31.6	20.5	10.6	33.3	99.3	97.1
COUNTY									
Mendocino County	86,265	25.5	8.1	25.6	27.1	13.6	38.9	98.9	97.1
Sonoma County	458,614	24.5	8.8	29.2	24.9	12.6	37.5	97	94
Marin County	247,289	20.3	5.5	31	29.7	13.5	41.3	98.2	96.4
Napa County	124,279	24.1	8.5	27.7	24.3	15.4	38.3	99.6	97.4
Solano County	394,542	28.3	9.2	31.3	21.7	9.5	33.9	101.5	100.2
Contra Costa County	948,816	26.5	7.7	30.6	23.9	11.3	36.4	95.4	92.2
Alameda County	1,443,741	24.6	9.6	33.9	21.7	10.2	34.5	96.6	94
San Francisco County	776,733	14.5	9.1	40.5	22.3	13.7	36.5	103.4	103.1
San Mateo County	707,161	22.9	7.9	33.2	23.5	12.5	36.8	97.8	95.6
Santa Cruz County	255,602	23.8	11.9	30.8	23.5	10	35	99.7	97.8
Santa Clara County	1,682,585	24.7	9.3	35.4	21	9.5	34	102.8	101.9
Monterey County	401,762	28.4	10.9	31.4	19.3	10	31.7	107.3	107.7
San Benito County	53,234	32.2	8.8	31.5	19.3	8.1	31.4	102.5	99.6
San Luis Obispo County	246,681	21.7	13.6	27	23.3	14.5	37.3	105.6	105.2
Santa Barbara County	399,347	24.9	13.3	29	20.1	12.7	33.4	100.1	98.1

Sources: U.S. Department of Commerce, Census Bureau (<http://www.census.gov>).

Labor Force

Total labor force for the JMPR study area in 2001 was 4.5 million. As with population, the two largest counties in terms of labor force for 2001 are Santa Clara (1.0 million) and Alameda (0.8 million) and the two smallest are San Benito (28.0 thousand) and Mendocino (43.0 thousand). There has been a wide range of growth in labor force among study area counties. The period 1990 to 2001 has seen significant growth in San Benito (29 percent), Sonoma (28 percent), San Luis Obispo (23 percent), and Solano (20 percent) Counties and slower than average growth in Santa Barbara (5.4 percent), Santa Cruz (5.4 percent), Marin (5.8 percent) and San Francisco (7.8 percent) Counties.

Unemployment in San Benito County has risen over the decade from 8.2 percent in 1990 to 11.7 percent in 2001, the highest in the study area. Monterey has the second highest unemployment rate at 9.5 percent for 2001. Significantly lower than average unemployment rates are seen for Marin (2.5 percent) and San Mateo (2.6 percent) Counties for 2001.

Table 3. Labor Force, Labor Force Growth, and Unemployment

	Labor Force							Unemployment Rate			
	Labor Force				Growth						
	2001	2000	1995	1990	1990-1995	1995-2000	1990-2001	2001	2000	1995	1990
STATE TOTAL	17,362,300	17,090,800	15,412,200	15,193,400	1.4	10.9	14.3	5.3	4.9	7.8	5.8
JMPR STUDY AREA	4,522,890	4,485,360	4,032,640	3,954,280	2.0	11.2	14.4	4.3	3.0	6.1	4.3
MENDOCINO	42,970	42,540	41,330	37,560	10.0	2.9	14.4	6.6	6.6	9.6	7.8
SONOMA	262,600	259,100	225,300	205,300	9.7	15.0	27.9	2.9	2.6	5.5	3.9
MARIN	138,100	139,400	128,700	130,500	-1.4	8.3	5.8	2.5	1.7	4.3	2.5
NAPA	56,600	55,200	57,700	57,400	0.5	13.0	16.0	3.3	3.2	5.2	4.1
SOLANO	201,400	197,400	173,100	167,900	3.1	14.0	20.0	4.1	4.2	8.0	4.7
CONTRA COSTA	509,800	504,100	456,000	439,100	3.8	10.5	16.1	3.3	2.7	5.7	4.0
ALAMEDA	754,900	739,000	682,000	683,200	-0.2	8.4	10.5	4.5	3.0	5.8	4.0
SAN FRANCISCO	436,900	434,300	398,200	405,300	-1.8	9.1	7.8	5.2	2.8	6.1	3.8
SAN MATEO	407,900	410,500	369,800	366,500	0.9	11.0	11.3	2.8	1.6	4.2	2.6
SANTA CRUZ	143,900	142,100	139,800	136,500	2.4	1.6	5.4	6.1	5.6	9.3	7.1
SANTA CLARA	1,012,700	1,008,100	867,000	840,600	3.1	16.3	20.5	4.5	2.0	4.9	4.0
MONTEREY	195,800	196,200	175,900	174,200	1.0	11.5	12.4	9.3	9.5	12.4	9.5
SAN BENITO	28,020	27,320	23,110	21,720	6.4	18.2	29.0	8.2	7.9	13.7	11.7
SAN LUIS OBISPO	118,600	116,000	101,600	96,200	5.6	14.2	23.3	2.8	3.0	5.6	4.8
SANTA BARBARA	202,700	204,100	193,100	192,300	0.4	5.7	5.4	3.5	3.7	6.7	4.9

Source: U.S. Department of labor, Bureau of Labor Statistics, Division of Labor Force Statistics

Income and Employment

Income is reported from two perspectives; 1) income by place of residence and 2) income by place of work. Income and employment by place of work are further reported by industry. Income and employment by place of work is also reported for wage and salary workers versus proprietors (business owners). Differences in these measurements often reveal important differences about the nature of the local economies that are important for socioeconomic impact analyses. For example, a large difference between income by place of residence and income by place of work might reveal that the economy of the area under study is largely driven by income earned from sources unrelated to work in the area and this will dampen the impacts of management changes that impact local work related income and employment. A large number of proprietors indicate the prevalence of small businesses that receive special treatment under Federal Regulatory Impact Reviews.

Income by Place of Residence versus Income by Place of Work. A wide variation is seen in the study area when comparing income by place of residence and place of work. In 1990, net income (the difference between income by place of residence and place of work) as a percent of income by place of work in the study area was 34.9 percent of the income by place of work. In 2000, this proportion has dropped to only 24.7 percent. In 2000, this ratio was negative for two of the study area counties, San Francisco (-9.4%) and Santa Clara (-2.6%).

Table 4. Personal Income by Place of Residence and by Place of Work For California

	1990						2000					
	A	B	A-B=C	D	C/B	D/B	A	B	A-B=C	D	C/B	
	Income by Place of Residence (\$000's)	Income by Place of Work (\$000's)	Net Income*	Adjustment for Residence**	Net Income as % of Income by Place of Work	Adjustment for Residence as % of Income by Place of Work	Income by Place of Residence (\$000's)	Income by Place of Work (\$000's)	Net Income*	Adjustment for Residence**	Net Income as % of Income by Place of Work	
California	655,567,167	482,925,921	172,641,246	-75,934	35.7	0.0	1,093,065,244	825,224,182	267,841,062	121,446	32.5	
MPR Study Area	186,542,551	138,283,627	48,258,924	-1,697,072	34.9	-1.2	363,936,984	291,743,151	72,193,833	-3,620,072	24.7	
Mendocino	1,357,933	826,068	531,865	3,514	54.4	0.4	2,146,557	1,286,730	859,827	18,266	56.8	
Sonoma	8,875,485	4,838,019	4,037,466	1,274,648	33.5	26.3	16,046,410	9,834,626	6,211,784	1,833,287	53.2	
Marin	8,249,379	3,898,749	4,350,630	1,667,415	111.6	42.8	15,003,372	7,300,898	7,702,474	3,338,923	105.5	
Napa	2,606,253	1,396,070	1,210,183	351,517	36.7	25.2	4,729,986	2,907,793	1,822,193	467,688	52.7	
Solano	6,723,681	3,777,645	2,946,036	1,482,811	78.0	39.3	10,866,704	5,419,529	5,447,175	3,020,738	100.5	
Contra Costa	21,769,539	11,492,645	10,276,894	4,399,175	89.4	38.3	39,194,448	20,729,218	18,465,230	9,187,760	89.1	
Alameda	29,944,932	22,178,340	7,766,592	220,194	35.0	1.0	55,972,377	41,084,692	14,887,685	3,373,599	36.2	
San Francisco	22,564,471	25,700,858	-3,136,387	-9,483,245	-12.2	-36.9	42,910,077	47,381,499	-4,471,422	-12,970,485	-9.4	
San Mateo	19,708,771	12,503,307	7,205,464	1,535,803	57.6	12.3	41,512,033	33,242,279	8,269,754	77,797	24.9	
Santa Cruz	5,061,315	2,809,424	2,251,891	754,967	30.2	26.9	9,610,039	5,294,057	4,315,982	2,072,654	81.5	
Santa Clara	39,217,410	35,253,151	3,964,259	-4,022,888	11.2	-11.4	92,879,526	95,335,504	-2,455,978	-14,515,058	-2.6	
Monterey	7,406,878	5,188,051	2,218,827	21,119	42.8	0.4	11,969,747	8,392,940	3,576,807	176,972	42.6	
San Benito	554,107	344,368	309,739	121,555	89.9	35.3	1,341,148	743,924	597,224	287,779	80.3	
San Luis Obispo	3,890,698	2,341,009	1,549,689	112,049	56.2	4.8	6,669,227	4,174,320	2,494,907	152,359	59.8	
Santa Barbara	8,511,699	5,735,923	2,775,776	-135,706	48.4	-2.4	13,085,333	8,615,142	4,470,191	-142,351	51.9	

* Net Income: There are several sources of income unrelated to work in a county that are recorded and they are generally referred to as transfer payments and property income. Social security and pensions are two of important transfer payments and dividends, interest and rent are the most important sources of property income. Social Security and Medicare deductions from current workers are recorded as a deduction in income in deriving income by place of residence. Adjustment for residence is also included in net income.

** Adjustment for Residence: The other difference between income by place of work and residence is called the residence adjustment. The residence adjustment is the net flow of income to a county from some residents that work outside the county of residence and bring income into the county (inflow of income) versus residents from other counties that work inside the county but take their income home to their counties of residence (outflow of income).

Source: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System (REIS).

There are several sources of income unrelated to work in a county that are recorded and they are generally referred to as transfer payments and property income. Social security and pensions are two of the most important transfer payments and dividends, interest and rent are the most important sources of property income. Social Security and Medicare deductions from current workers are recorded as a deduction in income by place of work in deriving income by place of residence. The other difference between income by place of work and residence is called the residence adjustment. The residence adjustment is the net flow of income to a county that results from some residents that work outside the county of residence and bring income into the county (inflow of income) versus residents from other counties that work inside the county but take their incomes home to their counties of residence (outflow of income).

In 1990, a total of \$1.7 billion of the income in the JMPR study area was earned in counties outside of the place of work. By 2000, this adjustment grew to \$3.6 billion.

Proprietors Income and Employment. Proprietors (small businesses) account for a significant proportion of both income and employment in study area counties. In 1990, proprietors in the JMPR study area accounted for 9.1% of income and 14.2% of employment. In the 1990s, the relative importance of proprietors increased. By 2000, proprietors accounted for 9.8% of the income and 18.9% of the employment. These proportions were slightly lower than that for the entire State of California. This is a fairly good indicator that small businesses are very important in the study area. See Table 5.

As with other economic indicators we have summarized, there is wide variation among the individual counties in the study area. In several of the counties in the southern section of the study area (Monterey, San Benito, San Luis Obispo, and Santa Barbara), proprietors account for a substantially higher amount of income and employment. Several of the counties show a significantly lower proportions of proprietors income/total income as compared to proprietors employment/total employment. Mendocino County's proprietors income is only 2.0 percent of

total income as compared to proprietors employment which is 19.5 percent of total employment. Other counties with similar scenarios are Solano and Alameda.

Table 5. Proprietors Income and Employment

	1990				2000			
	Proprietors Income (\$000's)	% of Total Personal Income	Proprietors Employment (\$000's)	% of Total Employment	Proprietors Income (\$000's)	% of Total Personal Income	Proprietors Employment (\$000's)	% of Total Employment
California	62,148,804	9.5	2,852,772	16.8	120,226,020	11.0	3,830,282	19.5
JMPR Study Area	16,889,884	9.1	779,007	360.4	35,757,023	9.8	1,032,751	1215.1
Mendocino	179,230	2.0	11,738	16.8	323,938	2.0	14,147	19.5
Sonoma	873,075	9.8	50,195	24.4	1,859,063	11.6	65,618	24.2
Marin	820,613	9.9	44,389	29.7	1,708,962	11.4	56,043	31.6
Napa	236,157	9.1	12,774	21.3	581,449	12.3	18,654	22.4
Solano	468,445	7.0	22,437	16.3	622,863	5.7	27,165	17.0
Contra Costa	1,660,360	7.6	84,000	21.0	3,955,517	10.1	110,789	23.4
Alameda	2,112,047	7.1	114,688	15.1	4,306,712	7.7	153,069	17.0
San Francisco	3,561,713	15.8	89,429	12.6	6,116,714	14.3	116,914	15.1
San Mateo	1,638,198	8.3	72,670	18.2	3,824,705	9.2	99,268	19.6
Santa Cruz	482,714	9.5	26,763	21.2	1,047,858	10.9	38,712	25.9
Santa Clara	2,295,244	5.9	145,677	13.9	6,198,826	6.7	190,713	14.8
Monterey	942,285	12.7	30,850	15.2	2,322,076	19.4	42,444	19.0
San Benito	88,965	13.6	3,756	24.0	238,064	17.8	5,416	25.1
San Luis Obispo	458,857	11.8	26,888	25.1	1,020,870	15.3	38,117	27.1
Santa Barbara	1,071,981	12.6	42,753	19.8	1,629,406	12.5	55,682	22.1

Source: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System (REIS).

Indicators of Economic Health and Wealth

Unemployment rates and Per Capita Income. Unemployment rates and per capita incomes are probably the two most popular measures used as indicators of the health and wealth of communities, states or nations. Through the 1990s both unemployment and real per capita income (per capita income in 2001 dollars i.e., adjusted for inflation using the Consumer Price Index) moved in the same directions for most counties in the study area. Unemployment throughout the study area rose during the first half of the decade and dropped significantly during the second half. Monterey and San Benito Counties have historically had the highest unemployment rates. Marin and San Mateo Counties have historically had the lowest unemployment rates.

Real per capita income remained fairly level during the 1990 to 1995 period, with the counties in the study area reporting slight increases or slight declines. It was the period 1995 to 2000 that had sharp increases in real per capita income. The four counties with the highest real per capita income in 2000, Marin (\$62,331), San Mateo (\$60,301), San Francisco (\$56,834), and Santa Clara (\$56,716) also had the highest increases from 1995 to 2000 in the study area. Mendocino (\$25,554) and San Benito (\$25,586) had the lowest real per capita income in 2000. Monterey County had the smallest increase from 1995 to 2000 in real per capita income in the study area

Table 6. Unemployment Rates and Per Capita Incomes

	Unemployment Rate (%)			Per Capita Income			Per Capita Income (2001 \$)		
	1990	1995	2000	1990	1995	2000	1990	1995	2000
California	5.8	7.8	4.9	21,882	24,339	32,149	29,653	28,280	33,058
Mendocino	7.6	9.6	6.6	16,794	19,374	24,852	22,758	22,511	25,554
Sonoma	3.9	5.5	2.6	22,729	25,569	34,863	30,801	29,709	35,848
Marin	2.5	4.3	1.7	35,786	43,340	60,618	48,494	50,358	62,331
Napa	4.1	6.2	3.2	23,420	27,568	37,928	31,737	32,032	39,000
Solano	4.8	8.0	4.2	19,576	20,867	27,354	26,528	24,246	28,127
Contra Costa	4.0	5.7	2.7	26,899	31,065	41,110	36,451	36,095	42,272
Alameda	4.0	5.8	3.0	22,926	27,212	38,624	31,068	31,618	39,716
San Francisco	3.8	6.1	2.8	31,188	35,992	55,272	42,264	41,820	56,834
San Mateo	2.6	4.2	1.6	30,313	36,064	58,644	41,078	41,904	60,301
Santa Cruz	7.1	9.3	5.6	22,043	26,117	37,567	29,871	30,346	38,629
Santa Clara	3.9	4.9	2.0	26,174	32,488	55,157	35,469	37,749	56,716
Monterey	9.6	12.4	9.5	20,717	24,832	29,695	28,074	28,853	30,534
San Benito	12.1	13.7	7.9	17,758	19,687	24,883	24,064	22,875	25,586
San Luis Obispo	4.6	6.6	3.0	17,825	20,594	26,932	24,155	23,929	27,693
Santa Barbara	4.9	6.7	3.7	22,970	25,467	32,734	31,127	29,591	33,659

Source: Income: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System (REIS).

Unemployment rate: U.S. Department of Labor, Bureau of Labor Statistics, Division of Labor Force Statistics

Income and Employment by Industry. For purposes of economic impact analyses, in terms of income and employment impacts, income and employment by industry is critical because it provides the necessary control totals in the economic accounting system. A limitation of this accounting system is that it is still based on the old industrial economy and generally is not designed to yield direct insights into how the use of natural resources and the environment are connected to the economy. Linking the economy and the environment is the very heart of the Socioeconomic Team's task. We need to be able to answer the question, if the use of the natural resources of the JMPR Study Area are changed, what will be the impact on the income and employment in the local economies? To answer this question requires supplemental information organized so that it maps directly into the current system of accounting. In some cases, the income and employment by industry statistics can give us upper bound estimates of the direct portion of impact (i.e., not counting multiplier impacts) for particular uses. Our approach here is to first look at the most aggregated information, then proceed to evaluate information collected by other institutions and how it maps into the more aggregated statistics. Each step along the way our objective is to see how close we can get to linking the economy with the environment and assessing the relative importance to the economy of natural resource base uses.

Tables 7 and 8 show the values and percentages of income and employment by industry to counties in the study area. At this very aggregated level, the distributions for both income and employment by industry are very similar for most of the counties. The counties in the study area are driven by the services sector.

Table 7, Personal Income by Industry

Personal Income By Industry (\$000s), 2000												
	Total	Farm	Ag. Services, Forestry, Fishing, & Other	Mining	Construction	Manufacturin g	Transporta- tion and Public Utilities	Wholesale Trade	Retail Trade	Finance, Insurance, and Real Estate	Services	Government and Government Enterprises
California	825,224,182	3,424,649	7,943,257	2,851,715	47,012,923	128,467,273	49,823,365	47,115,376	71,496,822	71,830,864	271,009,369	119,248,569
Study Area	291,743,151	3,018,746	2,042,716	934,675	16,166,414	59,886,105	14,794,266	15,037,837	22,250,049	25,216,023	101,689,185	30,288,137
Mendocino	1,286,730	25,863	41,009	(D)	103,509	210,441	64,176	(D)	178,114	50,536	345,782	233,640
Sonoma	9,834,626	178,115	120,951	76,092	1,112,460	1,969,874	389,684	365,396	1,006,663	710,265	2,670,638	1,234,488
Marin	7,300,898	(833)	(D)	(D)	607,793	242,514	203,739	291,487	812,576	1,045,498	3,330,911	561,473
Napa	2,907,793	115,764	70,345	(D)	246,501	622,755	120,846	(D)	286,533	180,987	782,277	390,449
Solano	5,419,529	24,315	44,744	24,727	571,423	601,996	253,821	205,811	547,217	235,418	1,282,427	1,527,630
Contra Costa	20,729,218	60,334	164,980	365,513	1,876,810	2,079,544	1,595,809	853,299	1,975,171	2,396,625	7,068,915	2,292,218
Alameda	41,084,692	(119)	186,215	51,243	2,780,983	6,883,531	2,596,816	3,428,926	3,492,682	2,005,942	13,077,290	6,581,183
San Francisco	47,381,499	-	126,426	79,519	1,480,390	1,750,359	3,589,434	1,474,814	3,703,088	10,727,986	18,730,070	5,719,413
San Mateo	33,242,279	102,958	(D)	(D)	1,751,030	4,428,802	2,789,664	1,524,252	2,605,707	2,900,905	15,353,673	1,637,553
Santa Cruz	5,294,057	221,624	75,315	5,204	377,375	922,955	169,562	256,572	563,451	298,412	1,668,896	734,691
Santa Clara	95,335,504	211,521	297,463	225,922	3,805,161	38,327,098	2,130,155	5,711,362	4,705,760	3,322,790	31,531,680	5,066,592
Monterey	8,392,940	1,387,752	628,427	9,550	437,838	499,764	284,149	313,453	794,580	473,230	1,893,698	1,670,499
San Benito	743,924	118,750	26,672	(D)	72,983	96,512	(D)	51,363	70,241	33,409	112,627	120,840
San Luis Obispo	4,174,320	151,587	93,602	12,500	418,977	334,179	322,879	107,693	529,648	251,528	1,101,806	349,921
Santa Barbara	8,615,142	421,115	166,567	84,405	523,181	915,781	283,532	453,409	878,618	582,492	2,738,495	1,567,547
Personal Income By Industry (% of Total), 2000												
California	1.0	1.0	0.3	5.7	15.6	6.0	5.7	8.7	8.7	32.8	14.5	10.4
Study Area	1.0	0.7	0.3	5.5	20.5	5.1	5.2	7.6	8.6	34.9	10.4	10.4
Mendocino	2.0	3.2	8.0	16.4	5.0	13.8	3.9	26.9	18.2	12.6	18.2	12.6
Sonoma	1.8	1.2	0.8	11.3	20.0	4.0	3.7	10.2	7.2	27.2	12.6	12.6
Marin	0.0	0.0	8.3	3.3	2.8	4.0	11.1	14.3	45.6	3.1	13.4	13.4
Napa	4.0	2.4	8.5	21.4	4.2	3.9	3.2	26.9	13.4	13.4	13.4	13.4
Solano	0.4	0.8	0.5	10.5	11.1	4.7	3.8	11.9	4.3	23.7	28.2	28.2
Contra Costa	0.3	0.8	1.8	9.1	10.0	7.7	4.1	9.5	11.6	34.1	11.1	11.1
Alameda	0.0	0.5	0.1	6.8	16.8	6.3	8.3	8.5	4.9	31.8	16.0	16.0
San Francisco	0.0	0.3	0.2	3.1	3.7	7.6	3.1	7.8	22.6	39.5	12.1	12.1
San Mateo	0.3	0.3	5.3	13.3	8.4	4.6	7.8	8.7	46.2	4.9	4.9	4.9
Santa Cruz	4.2	1.4	0.1	7.1	17.4	3.2	4.8	10.6	5.6	31.5	13.9	13.9
Santa Clara	0.2	0.3	0.2	4.0	40.2	2.2	6.0	4.9	3.5	33.1	5.3	5.3
Monterey	16.5	7.5	0.1	5.2	6.0	3.4	3.7	9.5	5.6	22.6	19.9	19.9
San Benito	16.0	3.6	0.3	9.8	13.0	6.9	3.4	4.5	15.1	16.2	16.2	16.2
San Luis Obispo	3.6	2.2	0.3	10.0	8.0	7.7	2.6	12.7	3.0	26.4	20.4	20.4
Santa Barbara	4.9	1.9	1.0	6.1	10.6	3.3	5.3	10.2	3.8	31.8	18.2	18.2

Table 8, Employment by Industry

Employment By Industry (number of jobs), 2000												
	Total	Farm	Ag. Services, Forestry, Fishing, & Other	Mining	Construction	Manufacturin g	Transporta- tion and Public Utilities	Wholesale Trade	Retail Trade	Finance, Insurance, and Real Estate	Services	Government and Government Enterprises
California	19,654,877	328,861	408,406	38,870	1,040,795	2,047,587	379,014	912,202	3,006,849	1,696,230	6,759,116	2,536,947
Study Area	5,476,530	81,482	88,267	7,457	301,249	595,826	246,627	232,547	813,704	478,845	2,009,938	607,067
Mendocino	49,818	3,163	2,012	(D)	3,139	5,128	1,425	(D)	8,768	2,930	14,662	6,437
Sonoma	271,593	9,475	6,167	533	20,665	34,060	8,269	8,581	44,113	23,514	86,505	29,711
Marin	177,605	843	(D)	(D)	12,179	5,646	4,437	5,717	29,750	23,498	77,433	14,410
Napa	83,401	5,350	2,703	(D)	5,183	11,227	1,977	(D)	12,941	5,947	26,396	9,468
Solano	159,852	2,597	2,346	535	12,524	11,066	5,179	5,108	30,569	10,758	45,904	33,266
Contra Costa	473,822	2,920	7,314	2,308	35,875	28,015	24,829	15,107	77,652	58,440	173,520	47,842
Alameda	902,712	1,155	7,953	710	51,011	103,259	50,453	52,191	128,300	60,754	312,288	124,638
San Francisco	773,679	-	2,990	587	26,111	32,222	43,684	23,879	107,614	103,642	335,359	97,591
San Mateo	506,154	3,449	(D)	(D)	27,773	39,328	46,863	23,409	71,099	49,874	206,770	31,770
Santa Cruz	149,630	8,949	2,995	132	3,878	11,980	3,813	5,708	26,456	11,247	50,902	18,570
Santa Clara	1,290,679	5,295	12,236	861	53,005	271,595	37,638	53,107	168,551	79,712	489,782	98,897
Monterey	223,754	18,710	26,197	281	3,967	11,062	6,182	6,768	34,662	14,996	50,034	34,895
San Benito	21,573	2,079	1,098	(D)	1,713	2,628	(D)	1,380	3,474	1,363	4,295	2,896
San Luis Obispo	140,869	5,050	5,177	323	10,325	8,838	5,647	3,886	27,359	12,519	41,096	20,649
Santa Barbara	251,389	12,447	9,079	1,187	12,901	18,772	6,231	7,706	42,396	19,651	84,992	36,027
Employment By Industry (% of jobs), 2000												
California	1.7	2.1	0.2	5.3	10.4	4.5	4.6	15.3	3.6	34.4	12.9	11.1
Study Area	1.5	1.6	0.1	5.5	10.9	4.5	4.2	14.9	3.7	36.7	11.1	11.1
Mendocino	6.3	4.0	6.3	12.3	2.9	17.6	5.9	29.4	12.9	10.9	10.9	10.9
Sonoma	3.5	2.3	0.2	7.6	12.5	3.0	3.2	16.2	3.7	31.9	10.9	10.9
Marin	0.5	0.0	6.9	3.2	2.5	3.2	16.8	13.2	43.6	8.1	11.4	11.4
Napa	6.4	3.2	6.2	13.5	2.4	15.5	7.1	31.6	11.4	11.4	11.4	11.4
Solano	1.6	1.5	0.3	7.8	5.9	3.2	3.2	19.1	5.7	28.7	20.8	20.8
Contra Costa	0.6	1.5	0.5	7.6	5.9	5.2	3.2	16.4	12.3	36.6	10.1	10.1
Alameda	0.1	0.9	0.1	5.7	11.4	5.6	6.9	14.2	5.7	34.6	13.8	13.8
San Francisco	0.0	0.4	0.1	3.4	4.2	5.6	3.1	13.9	13.4	43.3	12.6	12.6
San Mateo	0.7	0.0	5.5	7.8	9.3	4.6	14.0	9.9	40.9	6.3	6.3	6.3
Santa Cruz	6.0	2.0	0.1	5.9	8.0	2.5	3.8	17.7	7.5	34.0	12.4	12.4
Santa Clara	0.4	0.9	0.1	4.9	21.0	2.9	4.9	13.1	6.2	37.9	7.7	7.7
Monterey	8.4	11.7	0.1	4.5	1.9	2.8	3.0	15.5	5.7	26.8	15.6	15.6
San Benito	9.6	5.1	7.9	12.2	4.2	6.4	16.1	5.3	19.9	13.4	13.4	13.4
San Luis Obispo	3.6	3.7	0.2	7.3	5.3	4.0	2.8	19.4	3.9	29.2	14.7	14.7
Santa Barbara	5.0	3.6	0.5	5.1	7.5	2.5	3.1	16.9	7.8	33.8	14.3	14.3

(D) Not shown to avoid disclosure of confidential information, but the estimates are included in the totals.

Source: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System (REIS).

Commercial fisheries would be included under the category “Agricultural Services, Forestry, Fishing and Other”. In 2000, this category accounted for only 0.7% of income and 1.6% of employment by place of work in the study area. Several of the counties (Monterey, San Benito, Mendocino, and Napa) did have higher proportions than the average. This serves as a first step upper bound on the proportion of income by place of work for the direct impacts of the harvesting portion (not including multiplier impacts) of commercial fishing. Other direct impacts of commercial fishing would include some portion of Wholesale Trade (e.g., fish houses and buyers) and some portion of Manufacturing (fish processing).

The Retail Trade and Services sectors are where the direct impacts of tourism/recreation would be included. However, these categories are too broad to yield any useful bounds for estimation of the direct impacts for tourism/recreation. The accounts, as stated above, were simply not designed for this purpose. In any case, the first step of linking the three natural resource use activities to the economy yielded only limited insights.

Income and Employment: Additional Disaggregation

The accounts reviewed above are what are called two-digit SIC (Standard Industrial Classification) level of aggregations. The SIC system of accounting can actually go down to four and six digit levels, which contain more specificity about the activity. However, because of nondisclosure rules to protect the privacy of business information, the four digit level is the best available for large counties and even here there are many categories for which information is not reported due to nondisclosure. In this step, we will explore how much detail we can glean about the three sectors that are our primary interest. Only income is reported at the lower levels of disaggregation.

Commercial Fishing Industry. In 1995, fishing income was a little over \$117 million in the State of California. This represents less than one percent (0.02%) of income by place of work. Two of the counties (Mendocino, 0.66% and Monterey, 0.32 percent) do have higher proportions of fishing income, however, they remain under one percent of total income by place of work. The year 1995 was chosen for analysis because it was the last year that a significant number of counties were able to release data. Again, this would be the income received by harvesters or commercial fishermen including crews and proprietors of the harvesting operations. It would not include buyers and fish houses or processors of commercial fish products.

Table 9. Direct Income to Commercial Fishing Harvesting Sector (\$000s)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
California	170,671	140,424	129,910	133,414	120,338	117,640	109,820	106,752	94,532	103,807	103,391
Mendocino	6,043	5,386	4,975	5,545	6,079	6,009	5,608	5,148	5,207	6,241	6,085
Sonoma	2,547	2,065	1,946	1,286	1,593	1,327	1,399	796	709	770	824
Marin	(D)	1,274	1,246	1,452	1,702	1,394	(D)	(D)	(D)	(D)	(D)
Napa	(D)	123	126	149	207	(L)	(L)	52	50	(D)	60
Solano	400	204	140	154	236	127	135	154	145	164	(D)
Contra Costa	(D)	1,115	1,052	1,157	1,526	1,034	917	587	(D)	(D)	(D)
Alameda	2,764	2,279	1,783	1,570	1,410	1,549	(D)	(D)	(D)	(D)	(D)
San Francisco	(D)	631	540	323	421	546	1,773	552	(D)	859	(D)
San Mateo	(D)	4,375	3,276	3,644	3,860	2,707	(D)	(D)	3,015	3,597	(D)
Santa Cruz	1,113	917	649	639	739	563	630	764	(D)	(D)	(D)
Santa Clara	677	644	572	545	578	433	472	469	364	453	463
Monterey	(D)	21,500	23,929	24,002	13,994	18,898	13,126	11,682	(D)	(D)	(D)
San Benito	(L)	(L)	(L)	(L)	(L)	(L)	(L)	(L)	(L)	(L)	(L)
San Luis Obispo	(D)	4,328	3,905	4,851	4,895	(D)	(D)	(D)	(D)	4,173	(D)
Santa Barbara	(D)	3,797	3,261	3,206	3,292	2,909	2,970	2,148	(D)	(D)	(D)

(D) Not shown to avoid disclosure of confidential information, but the estimates are included in the totals.

(L) Less than \$50,000, but the estimates for this item are included in the totals.

Source: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System (REIS).

Tourism and Recreation. Tourism/recreation has been a notoriously difficult activity to document because the expenditures made while undertaking the activities are spread across so many sectors. Few that really capture the industry. Three commonly used are "Eating and Drinking Places" (within Retail Trade), "Hotels and Other Lodging Places", and "Amusement and Recreation Services" (within Services). A fourth is sometimes included "Museums, Botanical and Zoological Gardens" (within Services). The first three indicators of tourism/recreation are commonly used by the United Nations Environmental Programme when profiling third world countries for economic development programs. Unfortunately, these three sectors tell us very little about tourism/recreation. They are not good discriminators across areas in a single point in time, nor are they good indicators of the trends of tourism/recreation over time in a given place. Life style changes have resulted in high proportions of the local population eating out. Business related travel is a major portion of hotel and motel business and some communities may have extensive numbers of hotel and motels with very little in the way of tourism/recreation. In highly diverse economies like the U.S., measurements from these three industries yield nothing of use to get us close to linking natural resource uses with the economy. We must look elsewhere for supplemental information to get us closer to our goal.

Income and Employment: Supplemental Information. In step 2, we were able to narrow in on commercial fishing contributions to the local economies at the first stage of direct impacts. The industry accounts did not support any additional insights for tourism/recreation. In this step, we seek out additional sources of information and to see what they might reveal about the activities and their income and employment impacts.

Commercial Fishing Industry. For the commercial fisheries, we will first go to information compiled by the Pacific Fisheries Management Council (PFMC). The PFMC maintains a data base called PacFin which reports commercial fish landings by port, county and species. The PFMC also has developed a regional economic impact model to translate ex vessel value (i.e., the dollar amounts received by harvesters for their catch) to total income generated within the county where landed. **This amount will include full multiplier impacts.**

VALUE OF MARINE SCIENTIFIC RESEARCH IN THE STUDY AREA

Data gap for possible further investigation.

TOURISM AND RECREATION

Below we present the information and our preliminary assessment of the range of relative importance of tourism/recreation to the JMPR study area economy. Marine recreation uses in the JMPR study area would be some sub-set of these estimates.

California Travel Direct Impacts by County - Method

A study, *California Travel Impacts by County, 1992-2000*, prepared by Dean Runyan Associates for the California Travel and Tourism Commission and the Division of Tourism of the Technology, Trade and Commerce Agency was completed in March 2002. As stated in the introduction, the report describes the economic impacts of travel to and through the state of California over the time period 1992 to 2000. These estimates of the direct impacts associated with traveler spending in California were produced using the Regional Travel Impact Model (RTIM) developed by Dean Runyan Associates. The input data used to detail the economic impacts of the California travel

industry were derived from various local, state and federal sources. For accuracy, the following explanation of analysis methods is from the report.

Types Of Travel Impacts Included. Most of the travel that occurs in California is included in the scope of this analysis. All trips to California by U.S. residents and foreign visitors are included. The travel of California residents to other destinations within California is included, provided that it is neither commuting nor other routine travel. Travel to non-California destinations by California residents is not included as a component of destination spending. Outbound air travel impacts are included in the air transportation category. The impacts associated with both overnight and day travel are included if the travelers remain at the destination overnight or the destination is over 50 miles, one-way, from the traveler's home. These definitions are used to screen and, if necessary, to interpret and adjust local data used for travel impact measurements. The most conservative interpretation is employed where data limitations cause deviations from the above definition. The terms "traveler" and "visitor" are used interchangeably in this report. Both represent a person who is traveling in the state of California, away from his or her home, on a trip as defined above. The purpose of such travel can be for business, pleasure, shopping, to attend meetings, or for personal, medical or educational purposes.

Air Transportation And Travel Arrangement. This analysis focuses on travel and tourism as a component of local and statewide economies, and therefore focuses on destination-specific impacts. However, some impacts associated with non-destination-specific spending and employment are included. These non-destination-specific industries are air transportation and travel arrangement (travel agents and tour operators). These industries are classified as nondestination-specific because they provide services for travel to, through and from specific destinations. It is important to note, however, that the impacts of these industries (e.g., employment) occur within specific geographic areas, primarily those with commercial airport facilities.

Thirty-three counties in California had scheduled passenger air transportation in 2000. The associated employment impacts are allocated in this report to the county in which the employment is based. The associated spending impacts are also allocated to that county as non-destination spending.¹ However, it is important to recognize that the benefits from air travel also extend to those counties that do not provide air transportation. This might include, for example, an overnight visitor in Mendocino County who traveled by air from Chicago to Oakland. Because air transportation facilities provide travel services that benefit businesses throughout the state, it is appropriate to include air transportation as a component of the travel industry. But because of the regional character of air travel, it is sometimes useful to exclude this sector when analyzing local economic impacts. These considerations are, of course, most relevant with respect to those counties with the largest air transportation impacts.

Direct Versus Indirect Impacts Or "Multipliers". Economic impact measurements reported herein represent only direct economic impacts. Direct economic impacts include only the spending by travelers and the employment generated by that spending. Indirect or "multiplier" effects, which refer to the additional spending of businesses and employees induced by travel spending, are not included.

¹ San Francisco and San Mateo counties are the only exception. The employment associated with air transportation employment in San Mateo County is allocated to San Mateo, whereas most of the air transportation travel spending is allocated to San Francisco.

Impact Categories. The specific categories of travel impacts included in this analysis are as follows:

- **Expenditures:** Purchases by travelers during their trip, including lodging taxes and other applicable local and state taxes, paid by the traveler at the point of sale.
- **Total Earnings:** The earnings (wage and salary disbursements, earned benefits and proprietor income) of employees of businesses that receive travel expenditures. Only the earnings attributable to travel expenditures are included; this typically is only a portion of all business receipts.
- **Employment:** Employment associated with the above earnings; this includes both full- and part-time positions of wage and salary workers as well as proprietors.
- **Local Tax Receipts:** Tax receipts collected by counties and municipalities, as levied on applicable travel-related purchases.
- **State Tax Receipts:** State taxes, such as sales and gasoline taxes, attributable to travel expenditures and business taxes as levied on travel industry firms and employees.

Visitor Categories. Travelers are classified according to the type of accommodation in which they stay. The types of visitors are as follows:

- **Hotel/Motel/B&B Guest:** Travelers staying in hotels, motels, resorts, bed & breakfast establishments, and other commercial accommodations, excluding campgrounds, where a transient lodging tax is collected.
- **Private Camper:** Travelers staying in a privately owned (i.e., commercial) campground.
- **Public Camper:** Travelers staying in a publicly managed campground such as those managed by the California State Parks and Recreation Commission, the U.S. Forest Service or the National Park Service.
- **Private Home Visitor:** Travelers staying as guests with friends or relatives.
- **Vacation Home Visitor:** Travelers using their own vacation home or timeshare and those borrowing or renting a vacation home where transient lodging tax is not collected.
- **Day Visitor:** Both in-state and out-of-state residents whose trip does not include an overnight stay at a destination in California.

The “travel industry” as described in this report refers to a collection of businesses that provide goods and services to the traveling public. These types of businesses are coded according to the U.S. Office of Management and Budget’s Standard Industrial Classifications (SIC).

Local taxes refer to all city and county taxes. These include local sales taxes and room taxes. Property taxes are not included. State taxes include the state sales tax, the state gasoline fuel tax, and income taxes on travel industry firms and employees.

Interpretation Of Impact Estimates. Users of this information should be aware of several issues regarding the interpretation of the impact estimates contained herein:

- When comparing the impact estimates associated with different locations or different time periods, it is more appropriate to focus on destination spending (which excludes air transportation) rather than total travel spending.
- The estimates in this report are expressed in current dollars. There is no adjustment for inflation.
- The employment and business service categories found in the impact tables do not perfectly correspond to the industry categories used in various state and federal government publications. The spending and employment categories used in this report refer to a particular type of service, as opposed to an industry classification. For example, the accommodations category in this report includes only that spending or employment attributable to paid accommodations. It does not include spending on eating and drinking in a hotel restaurant or recreational services provided at a resort. In addition, government employees are not distinguished from the employees of commercial enterprises, as is often the case in other data series published by government agencies.

In the detailed table for each county, the first breakout, *Travel Spending by Type of Traveler Accommodation*, shows the travel spending by each type of traveler in the county. The second breakout, *Travel Spending by Type of Business Service*, indicates the amount of expenditures for different goods and services (e.g., accommodations, recreation) by all traveler types. Destination spending refers to all travel-related spending in the county except air transportation and travel arrangement.

California Travel Impacts by County – Results

Total travel spending in the JMPR study area was estimated by Dean Runyan at \$25.2 billion in 2000. This accounts for 1/3 of the \$75.4 billion that travelers to California contributed to the state economy. Four billion was spent on air transportation in the study area in 2000. Total destination spending, total spending excluding air transportation and travel arrangement, was estimated to be \$21.0 billion.

Employment in the study area generated by travel spending was estimated to be approximately 250 thousand. While San Francisco County accounts for approximately \$5.6 billion, or about 1/4, of the travel destination spending in the study area, it accounts for a disproportionately small amount of the employment generated by travel spending.

Spending on recreation related travel activities was estimated at \$3.5 billion. Recreation travel spending, the sector we are most interested in, is largely driven by five counties. San Francisco (\$1.0 billion), Santa Clara (\$484 million), San Mateo (\$355 million), Monterey (\$300 million), and Alameda (\$290 million) Counties together account for 69.8 percent of the recreational spending in the study area.

In the study area, an estimated 47,793 jobs are generated by the recreation component of travel spending. Recreational travel employment is driven by the same counties, with the exception of San Francisco, which was found to employ a very small number of people (15).

Total earnings generated by travel spending in the study area was estimated to be \$8.5 billion in 2000. Again, the five counties previously mentioned, San Francisco (\$2.1 billion), Santa Clara (\$1.2 billion), San Mateo (\$1.7 billion), Monterey (\$629 million), and Alameda (\$807 million) account for 76.3 percent of the earnings generated by travel spending in the study area.

Total tax revenues generated by travel spending in the study area were \$1.6 billion in 2000. Of this, \$676 million were local taxes and \$942 million were state taxes. Local taxes refer to sales and use taxes, and transient occupancy taxes collected by cities and counties. Property taxes and business license taxes are not included. State taxes include the state sales tax, the state gasoline fuel tax, corporate income taxes and personal income taxes.

Table 10. Travel Impacts, 2000

	CA	Study Area	Alameda	Contra Costa	Marin	Mendocino	Monterey	Napa	San Benito	San Francisco	San Luis Obispo	San Mateo	Santa Barbara	Santa Clara	Santa Cruz	Solano	Sonoma
Travel Spending by Type of Traveler Accommodation (\$Million)																	
Destination Spending	66,000	20,977	2,008	896	516	56	1,853	528	74	5,592	961	2,178	1,151	3,192	514	430	918
Hotel, Motel, B&B	34,500	13,580	1,315	422	239	35	1,256	386	12	4,355	471	1,408	584	2,206	247	140	405
Private Campground	2,500	425	3	29	38	3	12	19	19	-	72	20	23	83	37	40	28
Public Campground	900	101	-	5	4	1	15	2	1	-	20	9	16	2	12	1	14
Private Home	7,100	1,788	245	179	81	7	107	20	21	245	68	254	112	257	36	76	81
Vacation Home	3,600	451	11	26	25	4	44	16	2	28	76	15	27	16	68	7	87
Day Travel	17,700	4,631	433	235	130	18	419	185	20	964	254	471	290	627	114	167	304
Air Transportation	8,800	4,053	504	-	5	9	25	4	0	2,853	7	457	14	165	-	-	10
Travel Arrangement	900	58	1	9	11	1	7	1	0	5	2	2	4	6	5	1	5
Total Spending	75,400	25,236	2,531	905	533	75	1,885	533	75	8,502	970	2,659	1,169	3,419	518	430	933
Travel Spending by Type of Business Service (\$Million)																	
Destination Spending	66,000	20,977	2,008	896	516	56	1,853	528	74	5,592	961	2,178	1,151	3,192	514	430	918
Accommodations	12,900	4,963	434	142	97	13	461	139	9	1,603	196	467	242	818	135	50	158
Eating, Drinking	16,000	5,072	442	180	130	16	500	153	22	1,401	259	491	304	749	123	94	209
Food Stores	2,200	599	51	28	22	2	50	19	7	123	44	55	36	90	23	19	30
Ground Transport	8,800	2,372	423	266	56	9	71	26	4	290	62	380	92	447	46	86	116
Recreation	12,100	3,487	290	119	92	12	300	137	14	1,003	147	355	182	484	79	84	188
Retail Sales	13,900	4,484	367	162	119	14	471	154	18	1,173	254	430	295	604	108	98	217
Air Transportation	8,800	4,053	504	-	5	9	25	4	0	2,853	7	457	14	165	-	-	10
Travel Arrangement	900	58	1	9	11	1	7	1	0	5	2	2	4	6	5	1	5
Total Spending	75,400	25,236	2,531	905	533	75	1,885	533	75	8,502	970	2,659	1,169	3,419	518	430	933
Earnings Generated by Travel Spending (\$Million)																	
Total Earnings	24,900	8,458	807	253	191	25	629	221	22	2,111	306	1,705	372	1,204	178	127	309
Employment Generated by Travel Spending (Jobs)																	
Accommodations	201,000	66,881	5,690	2,300	1,390	201	5,100	1,820	170	16,700	3,810	5,820	4,100	11,560	2,480	1,040	2,700
Eating, Drinking	398,000	109,458	10,500	4,470	2,870	398	10,390	3,150	540	23,500	7,740	9,460	8,030	16,370	3,440	2,990	5,510
Food Stores	12,000	2,812	260	150	100	12	220	80	40	400	280	220	200	420	140	120	170
Ground Transport	47,000	11,857	2,480	1,040	230	47	300	150	20	1,500	330	1,740	500	2,130	180	510	700
Recreation	248,000	62,278	5,910	2,550	1,730	248	4,590	2,390	210	14,500	3,250	5,870	3,570	9,070	1,890	2,280	4,220
Retail Sales	114,000	32,124	2,870	1,330	870	114	3,220	1,040	170	6,500	2,500	2,720	2,560	4,340	990	1,030	1,870
Air Transportation	52,000	22,792	3,110	-	40	52	290	20	-	1,600	60	16,050	130	1,360	-	-	80
Travel Arrangement	28,000	8,899	900	490	520	28	180	60	1	2,600	140	340	250	2,220	300	60	310
Total Employment	1,100,000	317,100	32,710	12,330	7,760	1,100	25,280	8,710	1,250	57,300	18,120	42,710	19,330	47,480	9,430	8,020	15,570
Tax Revenues Generated by Travel Spending (\$Million)																	
Local Taxes	1,700	676	58	22	11	2	53	17	1	258	21	61	32	101	14	7	19
State Taxes	3,100	942	99	56	25	3	76	25	3	211	43	115	52	145	22	24	43
Total Taxes	4,800	1,618	157	78	35	5	130	42	5	469	64	177	83	246	36	31	62

Table 11. Total Recreation Travel Spending by County, 1992-2000 (\$Millions)

	1992	1993	1994	1995	1996	1997	1998	1999	2000	Average Annual Change
State Total	7,400	7,600	7,900	8,300	9,100	10,000	10,700	11,500	12,100	6.4
JMPR Study Area	1,975	2,066	2,169	2,334	2,591	2,869	3,080	3,386	3,536	7.6
Alameda	138	144	148	160	179	197	215	254	290	9.8
Contra Costa	70	73	76	81	87	97	106	113	119	6.9
Marin	49	55	58	61	67	73	78	86	92	8.3
Mendocino	43	43	45	48	49	51	54	57	61	4.5
Monterey	186	193	199	212	236	254	266	295	300	6.2
Napa	76	79	88	98	106	117	125	128	137	7.6
San Benito	9	9	9	10	11	12	12	13	14	6.0
San Francisco	536	566	602	649	730	813	872	992	1,003	8.2
San Luis Obispo	100	105	101	102	112	119	127	136	147	5.0
San Mateo	206	213	228	250	278	310	330	346	355	7.1
Santa Barbara	119	123	129	135	143	153	163	174	182	5.5
Santa Clara	221	233	250	281	328	382	423	456	484	10.4
Santa Cruz	50	52	52	55	60	66	69	78	79	6.0
Solano	53	55	57	58	61	67	70	76	84	5.9
Sonoma	119	123	127	134	145	158	170	181	188	5.9

Source: The California Travel and Tourism Commission, The California Technology, Trade, and Commerce Agency, and Dean Runyan Associates.

Table 12. Direct Recreation Travel-Generated Employment by County, 1992-2000 (Jobs)

	1992	1993	1994	1995	1996	1997	1998	1999	2000	Average Annual Change
State Total	195,000	194,000	206,000	210,000	222,000	241,000	236,000	248,000	248,000	3.1
JMPR Study Area	45,480	46,120	49,740	51,790	55,190	60,170	60,460	64,930	63,010	4.2
Alameda	3,580	3,630	3,840	4,000	4,310	4,680	4,810	5,650	5,910	6.6
Contra Costa	1,970	1,980	2,130	2,190	2,270	2,510	2,520	2,630	2,550	3.4
Marin	1,150	1,260	1,360	1,400	1,460	1,590	1,610	1,740	1,730	5.3
Mendocino	890	860	930	960	940	970	920	960	980	1.3
Monterey	3,570	3,600	3,800	3,940	4,210	4,460	4,420	4,820	4,590	3.3
Napa	1,860	1,880	2,140	2,300	2,410	2,610	2,590	2,490	2,390	3.4
San Benito	170	180	180	180	200	210	200	210	210	2.8
San Francisco	9,800	10,000	11,000	11,500	12,400	13,600	13,800	15,500	14,500	5.2
San Luis Obispo	2,790	2,850	2,820	2,750	2,900	3,050	2,970	3,150	3,250	2.0
San Mateo	4,400	4,420	4,860	5,160	5,530	6,060	6,050	6,210	5,870	3.8
Santa Barbara	2,780	2,790	3,000	3,050	3,110	3,280	3,440	3,570	3,570	3.2
Santa Clara	5,470	5,600	6,210	6,750	7,580	8,700	8,850	9,410	9,070	6.7
Santa Cruz	1,570	1,580	1,640	1,690	1,760	1,900	1,890	2,010	1,890	2.4
Solano	1,890	1,900	2,010	2,000	2,030	2,180	2,080	2,210	2,280	2.4
Sonoma	3,590	3,590	3,820	3,920	4,080	4,370	4,310	4,370	4,220	2.1

Source: The California Travel and Tourism Commission, The California Technology, Trade, and Commerce Agency, and Dean Runyan Associates.

Our next task is to identify how much of the tourism/recreation currently relates to marine resource uses.

Marine Related Recreation.

Generally, we know that recreational *fishing, scuba diving (both consumptive and non consumptive), pleasure boating, whale and other wildlife watching, surfing, kayaking, personal*

watercraft use, and beach visitation take place in the three JMPR sanctuaries. Quantitative estimates of the amount of activity in the study area or in the general area off the coast of Northern California are few in number and often incomplete. More is known about recreational fishing than for the other activities.

National Survey on Recreation and the Environment (NSRE) 2000. For the NSRE, "marine recreation" was defined as participation in at least one of 19 activities/settings, including beach visitation, visitation to watersides besides beaches for outdoor recreation, swimming, snorkeling, scuba diving, surfing, wind surfing, fishing, motor-boating, sailing, personal watercraft use, rowing, canoeing, kayaking, hunting for waterfowl in a water-based surrounding, viewing or photographing birds in a water-based surrounding, viewing or photographing other wildlife in a water-based surrounding, and viewing or photographing scenery in a water-based surrounding.

For activities, "marine" was defined as activities in oceans, sounds, and in mixed fresh-saltwater in tidal portions of rivers and bays. For settings (e.g., beaches, watersides, water-based surroundings, etc.) "marine" was defined as saltwater or saltwater surroundings such as oceans, sounds, and mixed fresh-saltwater in tidal portions of rivers and bays. (Leeworthy and Wiley, 2000)

The results below are for the State of California. Activities in the JMPR study area would be a subset of the state total.

In 2000, beach visitation was the most popular marine related activity in California. 12.6 million people visited the beach for a total of over 150 million days. Viewing or photographing Scenery was second in terms of total days with 4.2 million people and 108 million days. Swimming was the activity with the third highest participation rate with 8.4 million people spending almost 95 million days swimming. Other popular activities were bird watching, viewing other wildlife, surfing, visiting watersides besides beaches, and fishing.

Table 13. California Marine Recreation

Activity	By Place of Activity			By Place of Residence
	Participation Rate (%)	Number of Participants (millions)	Number of Days (millions)	Number of Participants (millions)
Beach Visitation	6.1	12.6	151.4	9.1
Visiting Watersides Besides Beaches	0.7	1.5	20.7	1.1
Swimming	4.1	8.4	94.6	6.1
Snorkeling	0.3	0.7	3.8	1.3
Scuba Diving	0.1	0.3	1.4	0.4
Surfing	0.5	1.1	22.6	0.7
Windsurfing	0.0	0.1		0.1
Fishing	1.3	2.7	20.3	2.5
Motorboating	0.8	1.5	11.6	1.5
Sailing	0.5	1.1	6.8	1.0
Personal Watercraft Use	0.3	0.7	2.9	0.7
Canoeing	0.1	0.2		0.2
Kayaking	0.2	0.4		0.5
Rowing	0.1	0.3		0.2
Water-skiing	0.1	0.3	3.3	0.2
Bird Watching	1.3	2.6	65.8	1.9
Viewing Other Wildlife	1.2	2.6	38.6	4.4
Viewing or Photographing Scenery	2.0	4.2	107.9	2.9
Hunting Waterfowl	0.1	0.1		0.1

Source: National Survey on Recreation and the Environment (NSRE) 2000.

Marine Recreational Fishing.

Marine Angler Expenditures in the Pacific Coast Region, 2000. Approximately 440 thousand saltwater anglers fished 2.2 million days in the Northern California region in 2000. In addition to the leisure benefits these anglers received from participating in saltwater fishing, their expenditures generated monetary benefits in the form of sales, income, and employment throughout the Pacific Coast. A variety of goods and services were purchased from sporting goods stores, specialty stores, bait and tackle shops, guide services, marinas, grocery stores, automobile service stations, and restaurants. The economic impacts of these purchases rippled throughout the Pacific Coast's economy and provided income and jobs in manufacturing, transportation industries, and service sectors (NMFS, 2001)

The majority of saltwater anglers, 388 thousand, were residents. Most of the resident mode of fishing was private/rental boats and shore. A much higher proportion of the 51 thousand non-resident anglers fished from party/charter boats.

Average per person trip expenditures in 2000 were highest for charter/party boats for both residents (\$112) and non-residents (\$328). Average party/charter fees for residents were \$56 and \$52 for non-residents. Average per person annual expenditures was \$1,588.

Saltwater anglers in Northern California spent a total of \$761 million in 2000. Anglers on party/charter boats spent \$35 million; on private/rental boats spent \$46 million; and on shore spent \$48 million. Of this, residents spent \$741 million and non-residents spent \$21 million.

Taken as a whole, the expenditure estimates provide an indication of the importance of marine recreational fishing to the economies of the coastal counties in Northern California.

Figure 2. The Northern California Region, NMFS



Table 14. Estimated Number of Days Fished and Participants in Northern California by Mode and Resident Status, 2000

	Resident	Non-Resident	Total
Total Days	2,074,628	92,377	2,167,005
Party/Charter Boat Days	198,267	39,429	237,696
Private/Rental Boat Days	963,959	30,961	994,920
Shore Days	912,402	21,987	934,389
Total Participants	387,927	51,221	439,148
Average Days per Participant	5.3	1.8	4.9

Table 15. Northern California Average Per Person Expenditures by Mode and Resident Status

	Resident	Non-Resident
Trip Expenditures		
Party/Charter Boat	112.03	327.73
Private/Rental Boat	43.91	125.46
Shore	48.48	173.80
Annual Expenditures	1,587.84	

Table 16. Northern California Total Expenditures by Mode and Resident Status (\$000s)

	Resident	Non-Resident	Total
Trip Expenditures			
Party/Charter Boat	22,212	12,922	35,134
Private/Rental Boat	42,322	3,884	46,206
Shore	44,229	3,821	48,050
Annual Expenditures	631,993		631,993
Total Resident Expenditures	740,758		740,758
Total Expenditures	740,758	20,628	761,385

Source: National Marine Fisheries Service, Marine Angler Expenditures in the Pacific Coast Region, 2000

Table 17. Northern California Average Per Person Expenditures by Mode and Resident Status

	Party/Charter		Private/Rental		Shore	
	Residents	Non-Residents	Residents	Non-Residents	Residents	Non-Residents
Trip Expenditures						
Private Transportation	20.45	72.00	13.53	64.24	18.50	66.19
Food	16.49	22.86	8.96	23.38	13.00	29.27
Lodging	8.58	45.04	3.66	10.21	9.90	30.41
Public Transportation	1.83	114.98	0.13	2.97	0.77	36.92
Boat Fuel			9.71	11.94		
Party/Charter Fees	56.11	51.62				
Access/Boat Launching	0.84	1.24	1.22	3.02	0.96	0.15
Equipment Rental	5.13	18.76	0.67	1.37	1.45	4.62
Bait & Ice	2.60	1.22	6.03	8.33	3.89	6.24
Total Trip Expenditures	112.03	327.72	43.91	125.46	48.47	173.80

Annual Expenditures	All
Rods & Reels	69.66
Other Tackle	49.26
Gear	14.49
Camping Equipment	7.89
Binoculars	1.76
Clothing	13.34
Magazines	2.09
Club Dues	2.08
License Fees	33.96
Boat Accessories	125.52
Boat Purchase	407.72
Boat Maintenance	105.44
Fishing Vehicle	582.53
Fishing Vehicle Maintenance	149.72
Vacation Home	16.53
Vacation Home Maintenance	5.86
Total Annual Expenditures	1,587.85

Source: National Marine Fisheries Service, Marine Angler Expenditures in the Pacific Coast Region, 2000

Table 18. Northern California Total Expenditures by Mode and Resident Status (\$000s)

	Party/Charter		Private/Rental		Shore	
	Residents	Non-Residents	Residents	Non-Residents	Residents	Non-Residents
Trip Expenditures						
Private Transportation	4,055	2,839	13,044	1,989	16,879	1,455
Food	3,269	902	8,634	724	11,866	644
Lodging	1,701	1,776	3,525	316	9,033	669
Public Transportation	363	4,533	122	92	698	812
Boat Fuel			9,358	370		
Party/Charter Fees	11,126	2,036				
Access/Boat Launching	166	49	1,176	93	877	3
Equipment Rental	1,017	740	646	43	1,327	101
Bait & Ice	515	48	5,816	258	3,548	137
Total Trip Expenditures	22,212	12,923	42,321	3,885	44,228	3,821

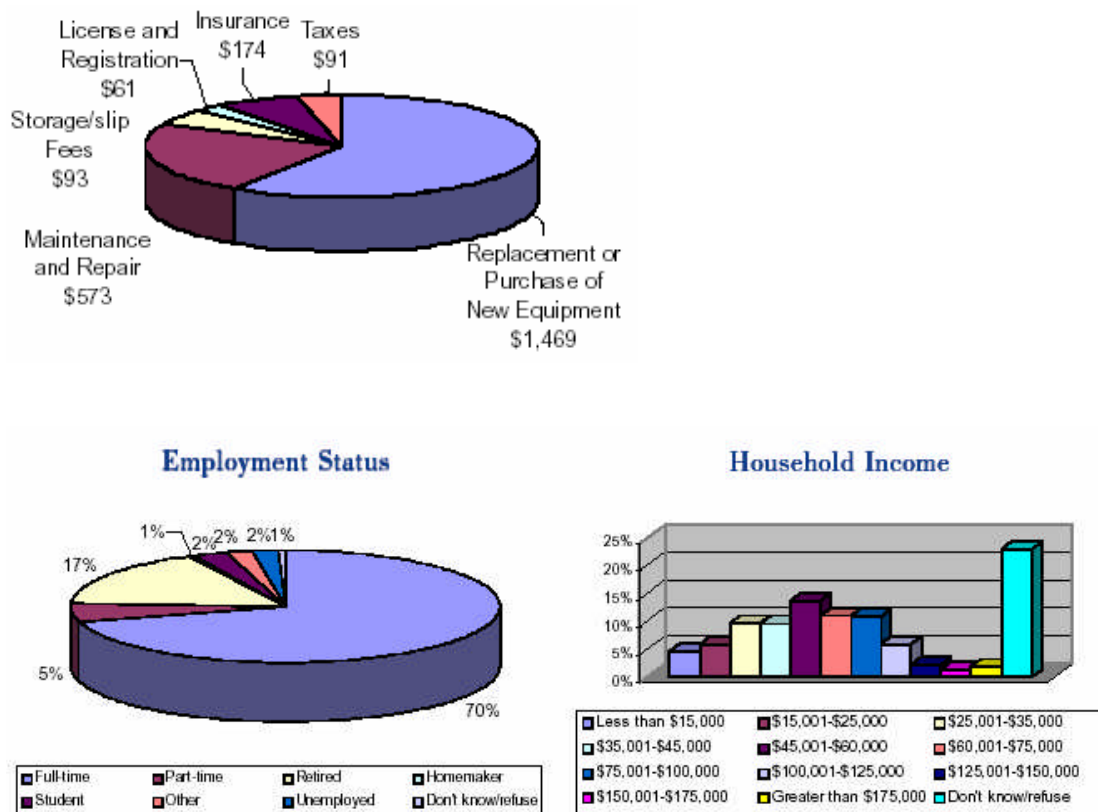
Annual Expenditures	All
Rods & Reels	27,023
Other Tackle	19,111
Gear	5,621
Camping Equipment	3,059
Binoculars	683
Clothing	5,174
Magazines	811
Club Dues	807
License Fees	13,172
Boat Accessories	50,137
Boat Purchase	162,855
Boat Maintenance	42,116
Fishing Vehicle	232,680
Fishing Vehicle Maintenance	59,801
Vacation Home	6,604
Vacation Home Maintenance	2,339
Total Annual Expenditures	631,993
Total Resident Expenditures	740,758
Total Expenditures	761,385

Source: National Marine Fisheries Service, Marine Angler Expenditures in the Pacific Coast Region, 2000

Pacific Socio-Economics Fishing Survey – Northern California, 1998. In 1998, NMFS completed the Pacific Socio-economics Fishing Survey. This survey had a Northern California component. The following are highlights from the survey results.

- About 35% of the Northern California anglers surveyed own a boat used for recreational saltwater fishing.
- The anglers surveyed on a party/charter or rental boat spent on average \$34 per day on boat fees, bait, and fishing licenses. Anglers fishing from shore spent on average \$9 per day on parking fees, bait, and fishing licenses.
- Anglers interviewed on multi-day trips spent an average of 5 nights away from home and spent \$171 on lodging expenses.
- About 13% of anglers surveyed who were employed gave up some income by taking a day of fishing. The average income “missed” was around \$436 per trip.
- The anglers surveyed who live in-state have been fishing an average of 20 years.

Figure 3. Recreational Fishing Socioeconomic Survey Results



Recreational Activities Possibly Requiring Additional Data Collection

- Pleasure Boating
- Personal Watercraft Use
- Kayaking
- Whale and Other Wildlife Watching
- Surfing
- Beach Visitation
- Scuba Diving

COMMERCIAL FISHING IN THE JMPR STUDY AREA

The California Department of Fish and Game (CDFG) collects information on the pounds and ex vessel value of the commercial catch by species and by 10 by 10 mile block where caught. We obtained that information for 348 CDFG blocks that run from Point Conception to the Oregon Boarder. The JMPR Study Area and the three sanctuaries are a subset of these blocks. These are historical data from 1988 to 2000. The data fields are:

Year
Month
Block Number
Port Landed
Species
Gear
Value
Pounds

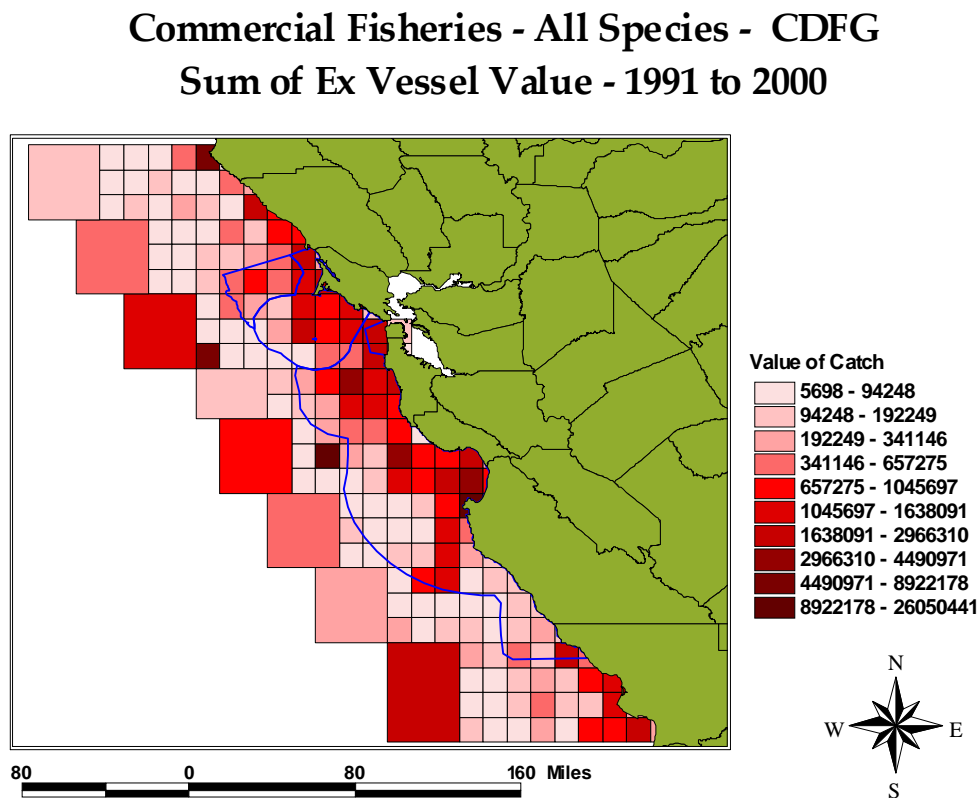
The first step was to define each of the Sanctuaries involved in the JMPR in terms of these CDFG blocks. That is, the CDFG blocks that “best” defines each Sanctuary. 10 by 10 minute resolution is pretty rough and will most likely understate or overstate what is caught in each sanctuary. With this in mind, we have historically (Channel Islands) used the centroid method to determine whether or not a block should be included in the analysis. In other words, if the center of the block lies within the Sanctuary, it would be included. However, this method is subject to local/expert judgment. If a block’s center is located outside a Sanctuary boundary, but is identified as vital to the analysis, it can be included.

We have defined preliminary study areas for each of the three Sanctuaries. It is important to keep in mind that where two Sanctuaries share a common boundary, a block can be assigned to only one of the Sanctuaries. In other words, we don’t want to double count a block in the analysis. Also, blocks cannot be split. It’s either all or none of the block.

Any primary data collection efforts for the study area will attempt to bring the spatial resolution down to 1 by 1-mile blocks.

Preliminary analysis is presented for the sum of ex vessel value of all commercial fisheries species for the period 1991 to 2000. The ArcView map presented below shows the spatial distribution of the value. The block with the highest historical value is located directly west of Santa Cruz and just outside MBNMS. The map also identifies several other “hotspots” in terms of value.

Figure 4.



Analysis presented here is the first step. Additional analysis could include:

Cross Tabulation of Where Fish Caught and Where Fish Landed

For estimating economic impacts on the local economies, we can establish cross tabulations of catch by study area and by port landed for each species group.

Monthly Data

So far, we have done nothing with the monthly data. It could be useful in looking at the seasonality of the different fisheries. Production of graphs over the past few years for each species group could be informative.

Gear Type

Cross tabulations and maps of gear and species types could be run. This, combined with the monthly patterns might define certain fishery fleets (squid/wetfish in the Channel Islands NMS used purse seine gear and the fishermen that fished these species fished them during different seasons of the year.

MBNMS has historically had the highest total value of commercial fishing in the study area. In MBNMS in 2000, 33.5 million pounds of fish were caught with a total ex vessel value of \$7.1 million dollars. GFNMS in 2000 had 0.5 million pounds of fish caught valued at \$1.1 million. 440 thousand pounds of fish were caught in CBNMS in 2000 with an ex vessel value of \$0.4 million. Commercial fishing catch increased dramatically from the early 1990s through the mid 1990s.

**Table 19. Commercial Fisheries, All Species, CDFG
Pounds and Ex Vessel Value, 1990 to 2000**

JMPR Sanctuaries

Year	Monterey Bay		Gulf of the Farallones		Cordell Bank	
	Pounds	Value (\$)	Pounds	Value (\$)	Pounds	Value (\$)
1990	7,771,627	475,445	182,376	184,574	65,206	98,122
1991	3,315,382	449,514	338,188	319,370	35,206	34,666
1992	6,621,627	806,724	1,571,305	1,355,780	368,737	211,516
1993	12,342,390	2,188,186	1,297,596	1,113,075	327,952	184,211
1994	25,795,188	6,494,288	2,353,857	2,163,109	597,838	548,659
1995	12,046,810	7,518,315	1,619,440	1,954,280	136,591	127,945
1996	21,748,731	7,141,664	1,677,245	2,355,415	129,019	145,111
1997	42,812,366	9,557,799	1,296,882	1,729,326	181,319	171,776
1998	19,612,520	5,870,207	891,705	1,581,974	417,874	377,206
1999	27,693,714	6,400,464	822,971	1,162,465	440,447	368,834
2000	33,513,661	7,128,238	533,710	1,130,798	138,634	255,133

For the three sanctuaries combined, 1997 was, economically, the most productive year for the commercial fisheries. 44.3 million pounds of fish were caught with an ex vessel value of \$11.4 million. The most recent year for which we have data, 2000, was also a highly productive year, with 34.2 million pounds caught within the three sanctuaries and 70.3 million pounds caught in the entire Point Sal to Point Arena study area.

**Table 20. Commercial Fisheries, All Species, CDFG
Pounds and Ex Vessel Value, 1990 to 2000**

Three Sanctuaries Combined and Entire Study Area

Year	Total JMPR Sanctuaries		Point Sal to Point Arena	
	Pounds	Value (\$)	Pounds	Value (\$)
1990	8,019,209	758,141	9,798,425	1,707,832
1991	3,688,777	803,550	5,813,341	2,824,082
1992	8,561,668	2,374,020	12,158,685	5,071,224
1993	13,967,938	3,485,472	19,617,885	6,789,243
1994	28,746,883	9,206,056	42,231,653	16,895,747
1995	13,802,842	9,600,540	32,845,328	21,298,184
1996	23,554,995	9,642,191	37,584,762	17,381,430
1997	44,290,567	11,458,900	61,719,033	24,085,211
1998	20,922,099	7,829,388	32,147,973	14,897,034
1999	28,957,132	7,931,762	56,526,999	16,821,007
2000	34,186,005	8,514,169	70,274,840	19,186,580

In 2000, the highest ex-vessel value species group in the three-sanctuary area was salmon at over \$2.1 million and just under a million pounds. In 1990, only 31 thousand pounds of salmon was caught with an ex-vessel value of \$85 thousand. In 2000, the next 4 top-ranked species in terms of ex-vessel value were squid (\$1.7 million), rockfishes (\$1.2 million), crab (\$0.9 million), and flatfish (\$0.8 million). In terms of overall significance to the commercial fishery, several of the species groups have increased from 1990 to 2000, including salmon, rockfishes, anchovy and sardines, roundfish, and tuna. The economic importance of mackerel has decreased from \$93 thousand in 1990 to \$25 thousand in 2000. Additionally, wild abalone, once a \$45 thousand fishery and ranked #5 in 1990, has been banned. In 1998, the California Department of Fish and Game (CDFG) closed the whole commercial industry of wild abalone.

**Table 21. Commercial Fisheries, All Species Groups, CDFG
Three JMPR Sanctuaries Combined
Ranked by Value
Pounds and Ex Vessel Value, 1990 and 2000**

2000			1990		
Species Group	Pounds	Value (\$)	Species Group	Pounds	Value (\$)
Salmon	991,194	2,078,047	Squid	3,766,616	259,735
Squid	13,939,345	1,677,840	Crab	61,511	118,117
Rockfishes	647,124	1,181,384	Mackerel	3,568,344	93,247
Crab	369,445	901,990	Salmon	31,258	84,917
Flatfish	1,498,816	831,224	Abalone	9,659	44,944
Anchovy & Sardines	15,984,661	713,081	Flatfish	111,429	40,268
Prawn	70,553	618,401	Rockfishes	82,879	35,075
Round fish	128,367	159,997	Swordfish	5,223	20,243
Tuna	110,073	114,500	Anchovy & Sardines	249,522	15,931
Sculpin & Bass	24,667	46,369	Round fish	25,150	14,244
Shrimp	67,964	44,534	Urchins	59,711	11,862
Swordfish	12,262	42,915	Other	36,997	11,374
Mackerel	159,097	25,537	Sharks	4,226	5,306
Sharks	31,437	20,715	Rays & Skates	5,698	1,540
Urchins	21,331	16,813	Surf Perch	395	518
Rays & Skates	70,004	13,708	Spiny Lobster	79	455
Other	20,131	12,868	Tuna	463	321
Grenadiers	30,299	5,554	Octopus	49	47
Surf Perch	2,369	2,800			
Smelts & Grunion	3,957	2,560			
Spiny Lobster	291	1,852			
CA Sheephead	260	761			
Herring & Roe	1,843	461			
Octopus	349	158			
Sea Cucumbers	138	90			
Mussels, Snails, Clams, Oysters	28	14			